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US Energy Policy is directly linked to National Security and must adapt to a new energy paradigm quickly in order to avoid catastrophic consequences. Maintaining the status quo will, at best, lead to gradual decline and leave the US subject to any global disruptions. Additionally, due to the energy policy of the US, the country indirectly funds terrorism. The US needs to take stronger actions to regain sound fiscal policy, increase energy efficiency, transition to sustainable and cleaner fuels and lower energy intensity in order to drastically reduce dependency on foreign sources of oil.

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MASTER OF MILITARY STUDIES

TITLE: **Energy Security is National Security**

SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF MILITARY STUDIES

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Preface

The purpose of this paper is to spark debate, and hopefully generate momentum towards a new energy economy in which the United States is much less dependent on foreign sources of energy. American power and security is directly linked to the cheap energy we have enjoyed over the past hundred years. If aggressive steps aren't taken immediately we will reap the consequences of short-sightedness and failure to adapt to a changing world. This paper is not intended to be alarmist; however, if we maintain the status quo on energy policy America will become more and more steeped in global conflict. The façade of spreading freedom and democracy will quickly give way to ensuring the free flow of oil at any cost. Americans servicemen will continue to go into harm's way for oil under the guise of ensuring the "American way of life." I would like to thank Dr. John Gordon for his mentorship with this project. Without his guidance I would likely remain bogged down in the details looking for a way out.

EXECUTIVE SUMMARY

Title: Energy Security is National Security

Author: Major Sean Mitzel, U.S. Marine Corps

Thesis: U.S. energy policy is directly linked to national security and must adapt to a new energy paradigm quickly in order to avoid catastrophic consequences. Maintaining the status quo will, at best, lead to gradual decline as a world power and, at worst, will invoke a rapid end to the status as the only global superpower and could feasibly induce societal collapse. The U.S must have a sound and clear Energy Policy to meet the challenges of this century.

Discussion:

Easy access to cheap oil has ensured the global dominance of the United States for 100 years. Economical energy, mainly in the form of oil, has shaped energy policy and catapulted the U.S. standard of living to the highest in the world. Prior to the 1970s the United States enjoyed vast natural resources in the form coal, oil and natural gas. Cheap global oil has since peaked and the United States imports an enormous volume annually among growing competition and demand for crude. The remaining bastions of oil are increasingly moving towards the more unstable parts of the world. Oil feeds the transportation sector of energy while electricity generation is an almost entirely separate problem. Transportation is the weak link of U.S. policy because of its dependence on oil. Additionally, there are several other factors that are confounding the energy problem and are also directly related to national security. Many postulate the terrorism is directly and indirectly funded by oil rich Islamic nations. Economic factors like inflation, unemployment and loose fiscal policy are converging with the energy crisis and how we implement all the elements of national power.

Conclusion(s) or Recommendations:

The U.S. needs to take stronger actions to regain sound fiscal policy, increase energy efficiency, transition to sustainable and cleaner fuels and lower energy intensity. The United States should convey a bold, measureable and timely energy policy that takes steps toward energy independence. This is a possibility if the U.S. rapidly transitions to natural gas, flexible fuel hybrids and pure electric vehicles as a bridge to future technological advances for transportation. Four pillars of electricity generation should be pursued to achieve independence, sustainability and diversity. A solid goal is for each pillar to make up 25% of generation. The four pillars are: Nuclear, Natural Gas, Oil and Renewables like biomass, hydroelectric, solar, wind and geothermal. This proportion would be considerably better than what is currently forecast. Additionally, the diversification of power would provide better security. A hydrogen economy is a remote possibility; however, waiting for the technology to catch up to the problem would be disastrous.

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Energy Security is National Security

Introduction

President George W. Bush said in his 2006 State of the Union address that, "Keeping America competitive requires affordable energy. And here we have a serious problem: America is addicted to oil, which is often imported from unstable parts of the world."[1] Was this a warning or empty rhetoric? Is the U.S. any less addicted to oil in 2011 than in 2006? The answer to that question is undeniably no. The 2010 National Security Strategy (NSS) and the 2011 National Military Strategy (NMS) provide a flowery conveyance to maintain the status quo with regards to energy policy completely diverging from strategic and fiscal reality. The U.S. needs to face and solve the momentous energy problem in front of the country. The NSS provides three paragraphs, under the subtitle prosperity, that speaks about transforming the energy economy to a sustainable low-carbon model. The more appropriate place for the energy economy is under the security subtitle placing it squarely in the National Security realm. The NSS states, "We must continue to transform our energy economy, leveraging private capital to accelerate deployment of clean energy technologies that will cut greenhouse gas emissions, improve energy efficiency, increase use of renewable and nuclear power, reduce the dependence of vehicles on oil, and diversify energy sources and suppliers."[2] This broad statement needs to be translated into a clear energy policy plan. The NSS lacks clarity and puts the country on an unsustainable course; focus, persistence and determination are required to meet this colossal challenge. The United States should contain an energy policy that transitions the country to a new energy paradigm by breaking free from foreign oil and essentially becoming energy independent in order to ensure national security; conversely, if the U.S. fails to adapt it will be her fall.

Since World War II, energy policy in the United States has been heavily supply-sided. Even with the apparent dichotomy between political parties, energy policy is largely the same

among politicians from the two major parties. The U.S. talks about spreading freedom and democracy on one hand and completely compromises moral clarity to secure cheap sources of energy on the other.

The United States is in a precarious position with regards to natural resources. Even minor disruptions, let alone serious price shocks cause upheaval in the U.S. economy due to over-reliance on oil. Peak Oil, although controversial, needs exploration to plot the course for the country. The Joint Operating Environment, 2010 states, "By the 2030s, demand is estimated to be nearly 50% greater than today. To meet that demand, even assuming more effective conservation measures, the world would need to add roughly the equivalent of Saudi Arabia's current energy production every seven years."[3] During the Vietnam conflict, General Westmorland famously said that he could see the light at the end of the tunnel. What he did not know was the light was from an oncoming train. U.S. energy policy is directly linked to national security and must adapt to a new energy paradigm quickly in order to avoid catastrophic consequences. Maintaining the status quo will, at best, lead to gradual decline as a world power and a diminishing quality of life for most; and, at worst, will invoke a rapid end to the status as the only global superpower and could induce societal collapse. This paper will mainly focus on oil but many other energy and economic factors are mentioned because of their relevance to this topic.

Strategic Context

Oil is a cheap source of fuel that has enabled the American economy to prosper greatly. The American car culture and consumer economy requires vast amounts of oil to supply. There are 247,000,000 cars in the US.[4] Additionally, Americans use more energy, per capita, than any

other nation on the planet. The U.S. is increasingly vulnerable to price shocks, geopolitical manipulation, and foreign policy entanglements due to addiction to oil.

This paper will attempt to show the seams and gaps in the American energy policy. Energy is quickly devolving into a critical vulnerability for the United States instead of a pillar for growth. In 2008 when a barrel of oil spiked to $147 Americans balked. Even though the price at the pump was still lower than most countries in the world, it crippled the American economy. To combat price shocks like the one seen in 2008, the US must transform the energy economy to be independent and sustainable to maintain the country's way of life and position in the world.

Energy and security is such a vast and complex subject and requires the paper to stay focused on indicators, warnings, and the way forward for America's impending energy crisis. However, it would be impossible to divorce energy security from national security. Many disruptions in energy security are directly related to national security. The following hypothetical situation is probably worst case but is possible and can be used for strategic planning.

Converging Storm

July, 2016, the Brent crude passes $250 a barrel for the second time in two years, West Texas Intermediate is close behind at $237. Deep into the lives of average Americans, the world energy crisis begins its escalation. The Egyptian government closes the Suez Canal to Israeli and U.S. ships placing upward pressure on crude. War in the Middle East seems imminent. The new Muslim Federation: Turkey, Egypt, Iran, Tunisia, Jordan, and Syria are calling for violent Jihad against Israeli occupiers of Palestine and those that support the Jews. Saudi Arabia's secret police is battling with protesters in Riyadh. Religious leaders are claiming that it is the responsibility of every true Muslim to fight and die for Allah against Zionists infidels.

Iran is threatening to close the Straits of Hormuz, the most critical oil chokepoint in the world. Over 17 million barrels a day (mbd) pass through the Straits of Hormuz supplying a significant portion of oil imports to the western world.[5] They require all U.S. troops to leave the Middle East and demand all ships pay a fee to transit or shipments of oil will immediately stop. Since Iran acquired nuclear weapon in 2013 and claims to have eight Shahab-4 nuclear tipped missiles, the U.N. and the United States is paralyzed. Russia is also silent because she has become closely aligned and sells a significant amount of oil and weapons to Iran.

In 2015, Mexico, long a major supplier of oil to the U.S., became a net oil importer now competing with the U.S. for crude. Cantrell, Mexico's biggest oil field has declined much faster than expected. Oil comprised over 40% of the Mexican Governments tax revenue and the country is spiraling into chaos. The Cartels are taking advantage of the situation and now hold more territory than when the Merida Initiative first began in 2006.[6] Mass illegal immigration is being reported in Texas, Arizona and California. Border Patrol is overwhelmed and state Governors are mobilizing the National Guard and screaming for the federal government to do their constitutional duty.

Major demonstrations and eco-terrorism are rampant in the Alberta tar sands from the massive environmental damage caused from exploiting the tar sands. Several pipelines have been blown-up and production has decreased by 50% to 1.5 MBD.[7] This disruption has further squeezed global oil supply.

The U.S. is excoriated in the international community for its quest for cheap energy and its spewing of carbon emissions. Billions of people around the world are literally starving and 25% of farmable land in the U.S. is being used to grow Ethanol. World population crossed 8 billion almost four years earlier than forecast.[8] World leaders around the globe are calling on the

U.S. to immediately stop growing fuel on moral grounds and pay the developing world reparations for its role in climate change. Despite the massive growth in Biomass fuels, the U.S. has only achieved 10% of its energy from renewable sources. Congress has flown back to Washington in an emergency session and passed conservation mandates, approved the construction of 26 nuclear reactors and even opened up drilling in the Arctic National Wildlife Refuge (ANWR). However, the reality is, "Oil company experts believe ... in at best 10 years time, ANWR could boost American production by 600,000 barrels a day."[9] Additionally, it will take decades to build nuclear power plants to relieve the over-burdened grid. Average gas prices just surpassed $7 a gallon and stations are running out due to hoarding. For the first time in history the United Nations just passed a resolution condemning the U.S. for the unethical practice of growing fuel amidst a starving world population.

The national debt just surpassed $20 Trillion but worse tax receipts are now significantly less than mandatory spending. The Federal Reserve has just announced quantitative easing (QE) four, with a plan of injecting $1 Trillion into the economy. The international community is dumping the dollar and screaming for a change in the world reserve currency. The Organization for the Petroleum Exporting Countries (OPEC) just announced it will no longer accept dollars for oil but the Yuan, Euro or gold. Core inflation is running at 5% but when energy and food are included most economists believe 10-15 % is a more accurate number. Many people are deathly afraid of a hyperinflationary spiral that looks inevitable.

The President of the U.S. has met with the National Security Council (NSC) and realizes the gravity of the situation. The U.S. has been ignoring the problem for decades and flatly failed to anticipate the current situation despite many indicators and warnings. Fear has been struck into the heart of U.S. citizens who are clamoring for the government to do something. Reports of

looting and rioting in several major U.S. cities are being reported. The President of the U.S. begins the emergency meeting by saying, "We have utterly failed to recognize and anticipate the catastrophic situation we find ourselves in today."

Framing the Problem

In 2007, world energy consumption was 483.597 Quadrillion Btu while the United States primary energy consumption was 101.554 Quadrillion Btu, about 21% of the total with 3 % of global population.[10] The United States is projected to use 114.5 Quadrillion BTUs by the year 2035.[11] More importantly world energy usage is expected to explode to 739 Quadrillion BTU by 2035 almost doubling current usage.[12]

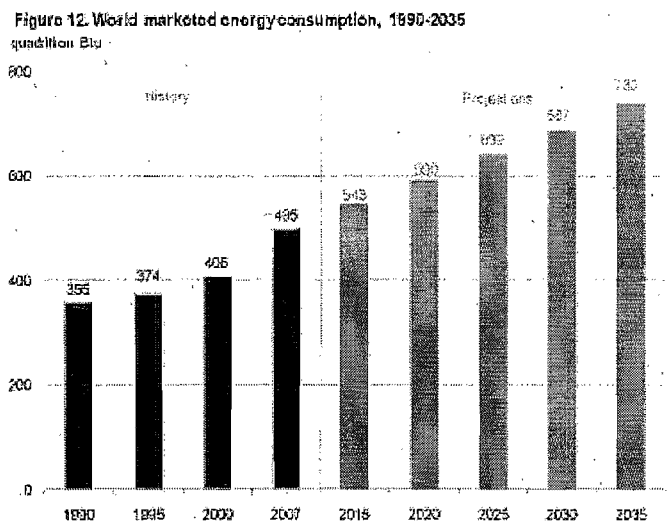


Figure 1. Source: Energy Information Administration.

The energy problem is highly complex and it helps to break down the issue into two categories: electricity generation and transportation.

Electricity generation is much less of a problem than transportation. It is feasible for the United States to become energy independent with regards to electricity generation. Efficiency measures, smart grids, natural gas, renewable and nuclear power could relieve the current over-burdened national structure. However, with the recent disaster in Japan it is likely that Nuclear power will be delayed and debated for some time before any progress in this area is made.

Transportation, on the other hand, is much more difficult than electricity generaration. The vast majority of U.S. transportation, 96%, runs on oil.[13] The main problem with America's oil addiction is the susceptibility to disruptions and the inconsistent and conflicted foreign policy that is required as the cost of doing business on the global commons. The other issue is the tie between oil consumption and economic growth. Cheap energy driving economic growth has been the American, and most developed countries, paradigm. The U.S. must break away from the stranglehold of dependency on foreign oil.

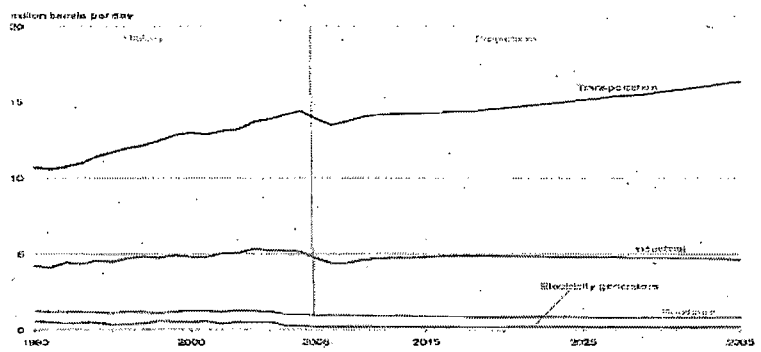
Another significant problem that accompanies addiction to oil is the indirect funding of terrorism. Many OPEC nations are successful at spreading their brand of radical Islam through vast amounts of money supplied by oil. In 2009, the United States third, fourth and fifth largest oil suppliers were Venezuela, Saudi Arabia and Nigeria.[14] All three of these countries either directly sponsor terrorism or at least turn a blind eye inside their borders. Admittedly it was, "Fifteen of the nineteen September 11 mass murders were Saudi subjects."[15] In addition to September 11, Saudis were involved in the Khobar Towers barracks, U.S. embassies in Africa and the USS Cole bombings. It is tempting to dismiss this as extremists and not state-sponsored. Robert Zubrin (2007), in Energy Victory, postulates, "In point of fact, the Saudi ruling family has direct responsibility for promoting terrorism against the United States and many other

nations."[16] U.S. foreign policy is paralyzed because of its dependence on oil from state-actors who sponsor terrorism.

Saudi Arabia is also in danger of being the next Arab country to see civil unrest. The tide of revolution is flowing through the Middle East and Saudi Arabia has investors worried. "If another Arab government were toppled, pushing the oil price over $150, the economic impact would almost certainly be larger."[17] The previous statement goes without saying. However, if Saudi Arabia were to fall, repercussions would be massive. In addition to the instability, there is the argument that buyers of Saudi oil are indirectly funding terrorism. Wahhabism, an Islamic fundamentalist sect, is headquartered in Saudi Arabia. The United States cozy relationship with Saudi Arabia is hypocritical and unnecessary, "The Saudis are estimated to have spent several hundred billion dollars over the past thirty years promoting terrorist ideology and organizations."[18] If Saudi Arabia did not have massive oil reserves they would likely be labeled a state sponsor of terrorism. The irony is, if they did not have oil they would not be able to fund, either directly or indirectly, terrorism. Saudi money is spent to establish Wahhabi Islamic centers around the world that preach hate and murderous Jihad. Young children are indoctrinated worldwide, "The precise number of Wahabbi madrassas set up globally by the Saudis is unknown, but on the basis of partial data, it is estimated to exceed twenty thousand."[19] As the number of oil exporting countries continues to neck down into the Middle East it becomes even more important to break away from dependence on oil.

When the price of oil increases through market means it is effectively a tax on Americans as well. Regardless of the way gasoline prices increase it causes a corresponding increase on almost all other goods. To test the theory that raising taxes lowers consumption and achieves energy independence one simply has to analyze the 2008-2009 recession data. In July, 2008 the

price of crude hit a record of $147 a barrel. This translated to an average gas price, or tax, in the U.S., of $4.11. This market imposed tax did decrease consumption significantly. Consumers car-pooled, drove fewer miles, generally conserved, and started moving toward the purchase of more fuel-efficient vehicles. In both years, consumption was lower; however, the U.S. still imported over 50% of supplied gasoline for motorists regardless of the consumption rate. In the big picture, the dip in 2008-2009 was sizeable but does not come close to answering the energy problem.



Source: Energy Information Association.

Figure 2. Shows the decline in consumption (2008-2009) during a period of high gas prices.

Perhaps, the most critical problem is dwindling supply. Peak oil theory states that any natural resource, in this case oil, follows a bell shaped curve where the top of the curve represents peak production. This theory can be applied to an individual well, field, country and the world. In 1956, M. King Hubbert accurately predicted the peak of US oil production in 1970.[20] Although America's peak is not a neat bell shaped curve it is close.

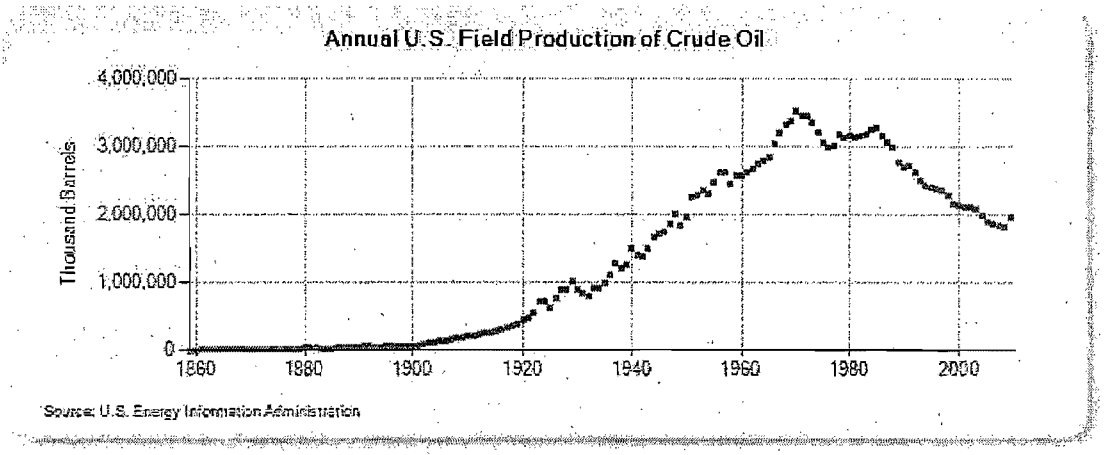


Figure 3. U.S. Oil Production 1860-2010

The bump in the early 1980s was due to significant finds in Alaska that Hubbert was not considering. If the world has peaked or is close to peaking, "oil depletion is arguably the most serious crisis ever to face industrial society ... we are nearing the end of what might be called easy oil."[21] Most oil experts agree that the cheap stuff is gone besides a few exceptions like Saudi Arabia and Iraq. What remains is either hard to get at or theoretical.

A more recent example of peak oil is Cantrell, once the biggest producing oil field in Mexico. Considerable investment was made to resurrect Cantrell in early 2000 with some success. A newer technique using nitrogen injection was used on the mammoth field. For four years Cantrell grew in production but without being forecast dropped off the side of a cliff. As Paul Roberts postulates, "postpeak production will simply deplete remaining reserves all the more quickly, thereby ensuring that the eventual decline is far steeper and far more sudden."[22]

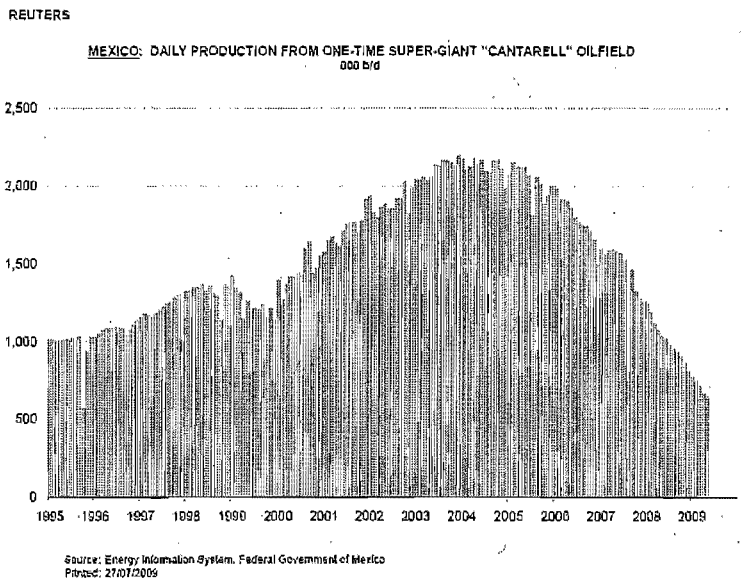


Figure 4. Cantrell Oil Production, Mexico 1995-2009.

American energy policy, which is tied to foreign policy, has remained largely supply side in nature. As consumption grew in the U.S., policy makers simply found more of it from foreign sources. This is exactly the wrong approach for long term national survival and prosperity. Increasing supply and diversification is certainly part of a sustainable energy approach; however, much more credence needs to be given to conservation, efficiency and developing non-fossil fuel sources of energy to break the chains of foreign crude.

America's Decline

The impending economic and energy crisis America faces will bring extreme security challenges in the future with regards to current and future wars. The rapid arming of China and Russia is occurring at a time when the U.S. is trying to cut defense and military spending. China increased military spending by 12.7% in 2011.[23] Part of Al Qaeda's strategy can be summed up with the following words from Osama Bin Laden, "We bled Russia for ten years until it went bankrupt and was forced to withdraw from Afghanistan in defeat... We are continuing in the

same policy to make America bleed profusely to the point of bankruptcy."[24] It would seem on the surface that Al Qaeda's strategy is working.

Recently, Ben Bernanke the chairman of the Federal Reserve postulated that inflation is in check and there is no threat despite the skyrocketing commodity prices overseas. In fact, in October of 2010 the chairman used the threat of deflation to justify quantitative easing two (QE2).[25] The only inflation that is being considered by the government is core inflation which leaves out volatile commodities like food and energy which is very significant to the economy and Americans. If the U.S. were still calculating inflation with the same methodology as in 1980 it would be reporting current inflation near 8%.[26] Instead, consumer price index (CPI) is used by the government to depress inflationary numbers.

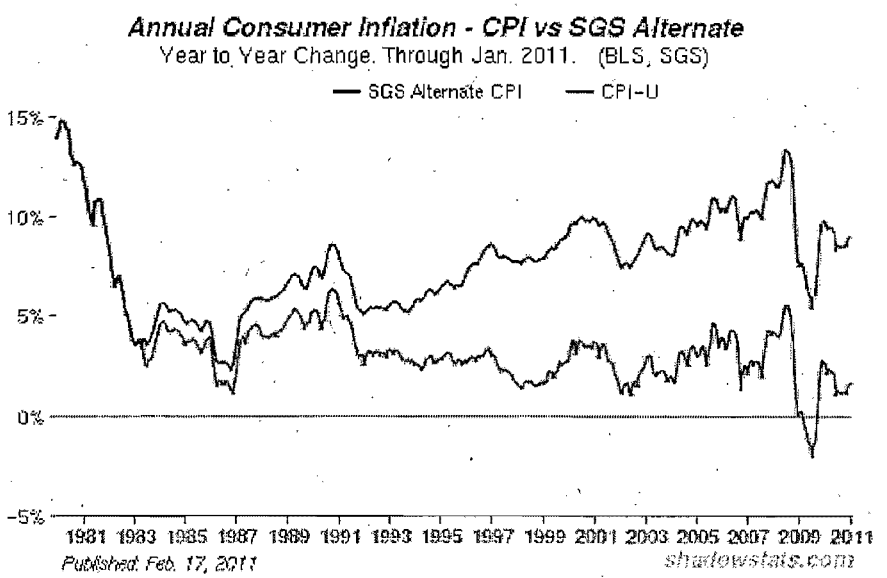


Figure 5. Annual CPI Inflation 1981-2010

Additionally, a simple look at the surging price of commodities over the last year confirms the coming crisis: wheat - 68%, corn – 96%, coffee – 101%, cotton – 156%, gold – 24%, silver – 99% and unleaded gas – 22%.[27] One of the underlying causes of the instability in the Middle East is the rising price of food. On average, Americans spend 11.8% of their income on food.[28]

On the other hand, countries in the Middle East and around the world spend considerably more of their income on food. The Joint Operating Environment (JOE), 2010, paints an accurate picture of the world the U.S. is likely to encounter. Food scarcity, water scarcity, and oil scarcity will converge together increasing pressure in volatile places on the globe.

Reducing dependence on foreign energy sources minimizes the impact of global disruptions that are so harmful to the American economy. America's moral high ground is continually compromised because of dependence on foreign sources of oil that are in increasingly unstable and corrupt locations. The perception is that the U.S. wages war for oil. Regardless of the truth to that statement, America is perceived that way. Policy makers need to properly frame the energy problem and then pursue a sustainable, realistic course of action with machine-like intensity.

The Energy Paradox

The success of the US economy rests on cheap energy mainly in the form of fossil fuels. American citizens pay considerably less at the pump than most of the world. For example, Oslo pays $6.27 in US dollar equivalents, London $5.79, and Tokyo $4.24.[29] However, cheap energy is gone, American is now and will be paying more and more for fuel. Additionally, most experts and politicians acknowledge that there is a problem. They might consider the problem depletion, dependence, environmental or sponsorship of terrorism but most agree that something must be done. Yet, no political will exists to actually do anything beyond symbolic.

Corporate average fuel economy standards (CAFÉ) have remained virtually unchanged since 1985 levels.[30] The 1973 oil embargo is an excellent case study to show s the vulnerability of America with regards to energy security. High energy prices often times precede recessions.

Since the U.S. is dependent on foreign oil, disruptions can propel the American economy into recession. Therefore, America should strive towards energy independence.

Troubling Signs

There are several warning indicators that deserve attention from the United States Government. First, the recent unrest in North Africa and the Middle East is proof of the tenuous position the west finds itself in. Disruptions caused by revolution and unrest have the ability to propel the American economy into recession simply based on speculation and fear. The price of oil has skyrocketed with very little actual disruption in the flow of oil. Libya, who produced 1.8 MBD in 2010, comprises less than 2% of the world's exports.[31] As of the writing of this paper, Libyan gas and oil has nearly halted.[32] If instability and revolution continues to plague North Africa and the Middle East, the interruption in world energy supplies would be catastrophic to the global economy. Besides civil unrest, terrorism has weighed down zones of turmoil across the world. Not surprising, oil and gas pipelines are a popular target. In Columbia, "the 480-mile pipeline has been hit more than a thousand times, causing close to three million barrels of oil to be spilled, and the pipeline to be nicknamed the flute."[33] North Africa and Middle East gas and oil infrastructure are continually attacked. U.S. policy has been government to government aid as well diversifying sources of oil. With the fragile world market for oil this is no longer a viable option.

Mexico, the number two supplier US oil is in a period of precipitous decline as an oil exporter. Production in Mexico has gone from producing 3.8 million barrels per day (mbd) in 2004 to producing 2.9 mbd in 2010 and dropping while consumption has climbed to 2.1 mbd in 2010.[34] The largest field, Cantrell, has seen the latest repressurization technology utilized to extract oil very efficiently. However, the effect has been a faster decline in the massive field.

Cantrell is expected to continue its slide in production and the country itself is expected to become a net oil importer by 2015.[35] When Mexico becomes a net importer this will have huge implications for the United States and will exacerbate an already tenuous position. Furthermore, the economic impact on Mexico is significant since much of the government revenue comes from the gas and oil industry. Mexico is quickly becoming a monumental challenge for the United States with narcotic-trafficking and illegal immigration which will only be exasperated with a collapse in government revenues.

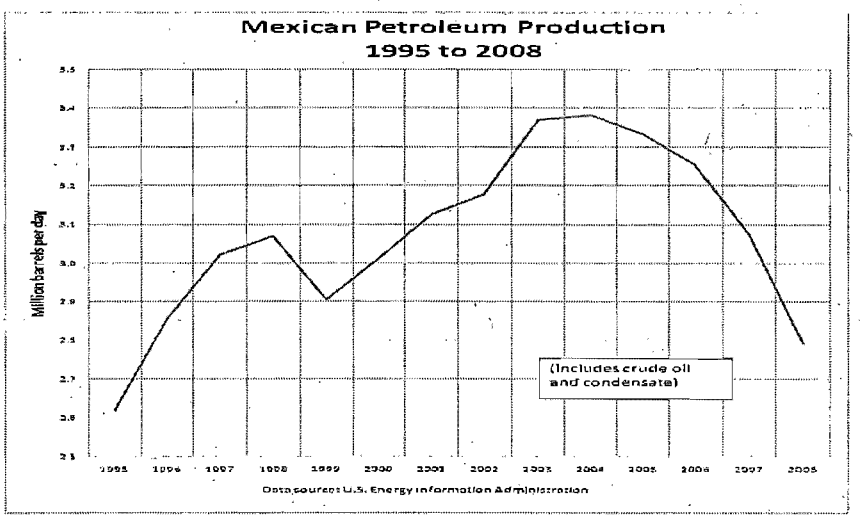


Figure 6. Mexico Oil Production 1995-2008.

The North Sea is another declining area that peaked in 1999.[36] The United Kingdom, Norway, Denmark, Germany and the Netherlands are all tied to North Sea oil fields. The United Kingdom, for example, became a net oil importer in 2005.[37] Furthermore, "Norway's oil production peaked in 2001 at 3.42 million barrels per day (bbl/d) and has declined to reach 2.35 million bbl/d in 2009."[38]

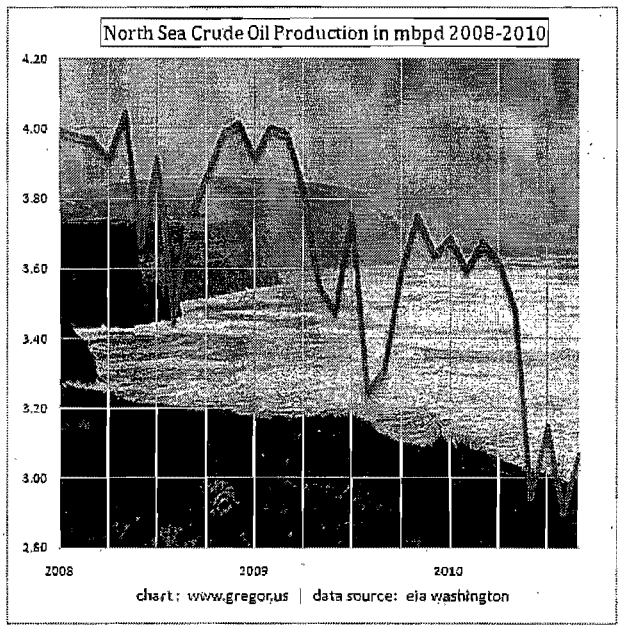


Figure 7. North Sea Oil Production 2008-2010

Much of the North Sea consists of mature fields. Norway's further decline is projected to reach 1.8 mbd by 2015. Although Norway's petroleum production has peaked, natural gas production is growing rapidly providing some relief for the Nordic country.

Indonesia moved from being a net oil exporter to net oil importer in 2006.[39] The demand for energy in Indonesia is growing at approximately 9% per year.[40] Indonesia will continue to tighten the noose on world supplies. Only 15 countries remain that export more than 1 mbd in the world.[41] Eleven of those countries are part of OPEC. [42] Indonesia was simply the latest country to switch from exporter to importer. Dwindling supply is inevitable and more and more power will continue to consolidate into fewer and fewer hands.

There is considerable speculation that Saudi Arabia has been overstating its amount of oil reserves and excess production capacity. The EIA claims that Saudi Arabia has a target production capacity of 12 mbd with another 1.5-2 mbd in excess.[43] However, in 2010, Saudi Arabia only produced 8.4 mbd of crude.[44] This discrepancy could be simple manipulation from

the state owned oil company or, perhaps, they have understated their ability to produce crude. Either way, whether geopolitical manipulation or the fudging of numbers, Saudi Arabia cannot be counted on to provide a stable, supply of oil. In addition to the alleged supply problems of Saudi Arabia, domestic consumption increased 50% since 2000 due to economic and industrial growth compounding the global supply problem.[45]

Rising Demand

Global oil demand grew 2.7 mbd in 2010.[46] Additionally, it is projected to rise another 1.5 MBD in 2011. Global demand is being driven by non Organization for Economic Cooperation and Development (OECD) nations, particularly China and India. The U.S. Energy Information Administration reference case assumes, "Liquids production (including both conventional and unconventional liquid supplies) increases by a total of 25.8 million barrels per day from 2007 to 2035."[47] The obvious assumption in this case, is that world supply can keep up with the increase required to reach that figure which is highly unlikely.

China's growth is exploding and demand for energy growing. China is a net importer of oil with a population of over 1 billion people and a burgeoning middle class China's quest for energy cannot be ignored. China surpassed Japan as the number two oil importer in the world. Strategic planners must consider, "anticipated growth of over 1.2 million bbl/d between 2009 and 2011 represents about 37 percent of projected world oil demand growth during the 2-year period according to the September 2010 *Short-Term Energy Outlook.*"[48] Future implications of China's development are staggering.

Although the NSS does not seem to take energy security seriously, the JOE, 2010 does. Along with traditional military threats, energy security garnered a significant amount of thought from the Joint Force Commander and his staff. The document portends, "The Chinese are laying

down approximately 1,000 kilometers of four-lane highway every year, a figure suggestive of how many more vehicles they expect to possess, with the concomitant rise in their demand for oil. The presence of Chinese "civilians" in the Sudan to guard oil pipelines underlines China's concern for protecting its oil supplies and could portend a future in which other states intervene in Africa to protect scarce resources. The implications for future conflict are ominous, if energy supplies cannot keep up with demand."[49] It is clear that China is looking to become a car culture and modern energy user like the United States. It is also clear China is willing to guard and secure their supply lines evidenced by their rapid military buildup. It is unlikely that world oil production will be able to keep up with demand. The future holds, "A severe energy crunch is inevitable without a massive expansion of production and refining capacity. While it is difficult to predict precisely what economic, political, and strategic effects such a shortfall might produce, it surely would reduce the prospects for growth in both the developing and developed worlds."[50] The conclusion for the U.S. should be to get ahead of the global squeeze on supply and the general economic slowdown due to higher chronic energy costs.

India, possessing 15% of the world population, has a rapidly expanding economy that is increasingly more energy hungry. India is the fourth largest consumer of oil behind the United States, China, and Japan. India's demand is rapidly increasing in combination with flat production. India will become more and more dependent on foreign oil and will be competing on the global market further complicating the U.S. energy position .

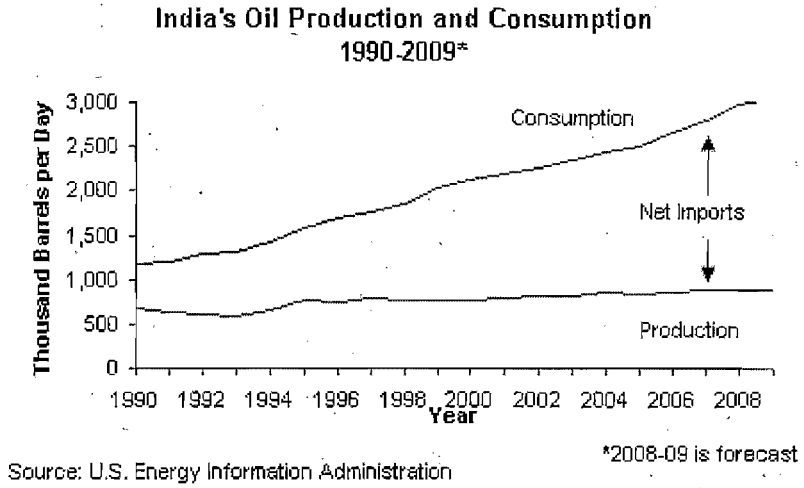


Figure 8. India Oil Production/Consumption 1990-2008

Even with the dire situation that the United States faces with regards to oil, demand in the US and around the world is still growing. In a situation with rising demand and constricting supply the U.S. would be wise to tackle the oil problem now.

Choke Points

More than half of the world's oil travels via tanker through strategic chokepoints around the globe. The two most significant chokepoints by volume are the Straits of Hormuz and the Straits of Malacca. The international energy market is dependent on the free flow of oil and the United States is the most dependent importing more than half of the country's needs. The United States devotes considerable amounts of political capital and treasure to ensure freedom of the seas and the straits. As the supply and demand curve become tighter and tighter it is even more crucial that these strategic chokepoints remain free flowing.

The recent upheaval in Egypt has policy makers eyeing the Suez Canal. Although only 4.5 MBD pass through the canal, a significant global oil shock would occur if it were to close.[51]

If the Muslim Brotherhood establishes a foothold in Egyptian government the closing of the canal quickly becomes a possibility.

Future Conflict

In the 21st Century the Military must prepare for a wide spectrum of military operations. Unstable regimes, food security, energy security, unemployment and inflation will all be factors in likely resources wars in the future. The U.S. should position itself in a position of strength according to the instruments of national power. The force will be required to fulfill its roles and missions including, "The protection of the homeland; the maintenance of the global commons; the deterrence of potential enemies; reassuring partners and allies; and when necessary, fighting and winning conflicts that may occur around the world."[52] Energy security must be factored into military policy. If the Middle East explodes and oil goes above $200 a barrel, the U.S. will likely institute austerity measures that will affect the ability to police the worlds commons. The United States must come to the conclusion that it cannot continue to be the world's police force. It must make hard decisions about energy security and narrow its strategic interests.

The Way Ahead

The US must take a comprehensive approach to energy security. Most important, energy security must now be viewed as a national security issue. The American people must understand this vital point. A basket of measures can be employed to ensure energy security. Three broad categories are recommendations for this crisis. First, the United States must implement smart, targeted mandates to steer energy transformation through efficiency, conservation and research. Next, the U.S. must diversify the type of fuel used for transportation. Finally, domestic drilling must begin immediately to bridge the energy gap. Since America consumes between 18-20 mbd and only produces 8-9 mbd, 9 mbd would have to be acquired to achieve oil independence. If the

U.S. accepted the notion that oil imports from North and South America were acceptable then 1-3 mbd could easily be imported from friendly, non-OPEC nations. That would leave a deficit of 7 mbd to bridge.

The government needs to communicate a coherent energy policy and provide leadership to implement it. Several mandates should be implemented as soon as possible. First, all vehicles manufactured and sold in the United States must be flexible fuel, diesel, electric, hybrid or natural gas vehicles. This mandate would break the monopoly that oil holds over transportation by giving a market to alcohol fuels, biodiesel and natural gas. Second, CAFE standards must be proactively raised to increase efficiency. Third, all government vehicles would be required to transition to these new types of vehicles within 10 years. Fourth, ethanol would be required to comprise 15% of all domestic gasoline within three years and 20% within five years. Furthermore, all regulation discouraging diesel cars from being manufactured, imported and sold in the U.S. would be removed. 10% Biodiesel would be required in all gas stations in the U.S. with a plan to incrementally increase its use with an ultimate goal of using 50% biodiesel. Additionally, after the first three years, every gas station would be required to carry one pump that was at least 85% ethanol, methanol or biodiesel. After that, the market would dictate how many pumps to transition. Furthermore, all subsidies to companies for oil would be removed and transitioned to alternative fuels like biodiesel, ethanol, methanol and natural gas. This last incentive would naturally make the alternative fuels cheaper and thus more attractive. Finally, further domestic drilling in the Arctic National Wildlife Refuge (ANWR) and the Gulf of Mexico should begin immediately to help bridge the gap.

To understand if the previous mandates would work, it helps to explore the Brazil experience. At the time of the first oil shock in 1973 Brazil imported 80% of its oil; today, Brazil

is oil independent and is the largest Ethanol exporter in the world.[53] In contrast, the U.S., absent a meaningful energy policy, has moved from importing 30% of its oil in 1973 to over 60% currently.[54] All Brazilian gas has between 20-25% ethanol. Additionally, over 50% of the vehicles on the road are flexible fuel vehicles capable of accepting 100% ethanol.[55] 100% of greenhouse gasses are eliminated by using sugar ethanol in place of gasoline and every gas station in Brazil has at least one ethanol pump giving consumers choices. Furthermore, in 2004 ethanol was 20% cheaper than gasoline and currently is more than 50% less expensive. On the other hand, America is subject to the global oil market and price manipulation from OPEC. As part of a broader strategy, Brazil has expanded domestic oil drilling operations successfully to help achieve energy independence. Finally, "Ethanol burning cars release much less sulfur dioxide, carbon monoxide, and particulate emissions than their gasoline counterparts, and this has resulted in a radical improvement in air quality in many Brazilian cities."[56]

Incentives are a critical component to energy policy. Consumers must be economically incentivized to change their behavior. Deep subsidies towards fuel efficient vehicles should be invested in as a national security issue. The result of switching to alternative fuels should be seen as patriotic to break the addiction to oil with an added bonus of cleaning up the environment. Enriching OPEC countries indirectly funds terrorism and requires the U.S. to compromise its moral authority in the most unstable portions of the globe. U.S. servicemen and women go in harm's way every day to ensure the free flow of global oil supplies. The U.S. polices the global commons and ensures freedom of the seas which is a subsidy that must be questioned. In addition to taking away massive wealth that funds Islamofascists this policy would put more farmers to work around the globe reducing global poverty and increases jobs in America.

Efficiency is a critical piece of a transformational energy policy. Japan's aggressive efficiency approach has netted great gains for its country, "While oil remains the primary source of energy in Japan, its share in the total energy mix has fallen dramatically from a high of 77 percent in the 1970s to below 50 percent today."[57] Japan essentially uses the same amount of oil today is the country did in the 1970s. Japan's path of conservation was through energy intensity improvements, they simply use less. Furthermore, it has been successfully ingrained in its culture. The majority of Japanese people are conservation minded because they understand the national security aspect of their energy policy.

Conclusion

National Security Advisor, General Jones, stated that six different agencies dabbled in the energy security realm.[58] This should give the reader pause. Energy policy requires strategic vision and implementation to deal with the monumental problems that face the U.S. General Jones was implying that there really was no uniform, focused policy.

The United States is precariously close to energy crisis at any given moment. Energy drives the economy. The American economic engine is based on growth; therefore, America needs ever expanding sources of energy. To solve the American energy equation a basket of measures must be taken immediately to stem the absolute train wreck that is in sight. Energy disruptions have a ripple effect that can decimate economies. Energy security is directly related to economic survival.

Addiction to fossil fuels enslaves foreign policy, ensures trade deficits and destroys the environment. Energy security is quickly becoming America's critical vulnerability which must be protected, strengthened and turned into a critical capability. The efficiency of Japan, the fuel choices of Brazil and the ingenuity and determination of America can change the energy

paradigm if someone would lead. The U.S. can achieve a sustainable energy security that complements national security. Hard decisions will have to be made that balance short term and long term interests. Most importantly, the United States needs leadership to communicate the problem, show the need for action and boldly implement the plan.

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